Digital Transformation Chisinau 2030

VISION DOCUMENT

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4T Think Tank

Logonaam

Executive Summary

Vision statement for Digital Transformation Chisinau 2030

This document summarizes the Vision for Digital transformation Chisinau 2030 program.

A vision clearly indicates the ultimate end goal of the program, and the real benefits the citizens will experience.

Vision

Chisinau will offer for its citizens in a sustainable[1] way the highest quality of living, and the best entrepreneurial climate, through innovative smart solutions.

The **Digital Transformation Framework** has been developed in order to describe the objective and the scope of the program. It covers the main initiatives to be undertaken to deliver on the defined expectations. It covers the important projects where ICT will play a significant added value role, organized around core societal domains. **These initiatives** finally aim to deliver value to citizens and businesses. Furthermore, the framework highlights the **enabling initiatives**, which are necessary actions to support the execution of these initiatives. They include governance, ICT infrastructure, budgeting, and legislation and are as essential as the initiatives to fulfill the smart city ambitions.

Key metrics have been identified and defined aiming at measuring the outcomes. Potential challenges and **risk mitigation actions** were also identified. Some clear **conditions for success** have been highlighted. This is expressed in a pyramid of needs, and an overview of the learnings from similar projects. These are important guidelines to be taken into consideration.

The vision document is continued with a clear selection and prioritization of the projects. These projects will be put into a

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1 *Sustainable from ecological, financial, social and democratic point of view*

master plan along with their **roadmap** and **timeline objective**. Finally, an assessment and inventory should be made of the key capabilities and resources (human, financial) needed for a smooth execution.

Methodology

Creating a Vision, which is the objective of this study, for the City Hall Executive and the City Hall Council, should be based on a methodology used for strategic business plans.

For this purpose, the research has undertaken the following activities:

- Meetings and Interviews (nr. TBC) with Chisinau City Hall executive team including Mayor of Chisinau Municipality, Deputy Mayors, and representatives of the IT Department, Financial and Economic Department, Social Department.
- Engagements and commentaries explored with the Public Institution E-Government Agency, development partners, and other stakeholders.
- Review of the major documents drafted by the donor organizations (WB, UNDP, EUD, EBRD, etc.) and strategic plans in the context of SMART interests.
- Secondary research – a wide ranging scan of SMART cities programs, best practices and approaches fitting into the context of the Chisinau municipality realities.
- Assessment of a SMART City Framework approach and consideration of international standards.

Overall, the Smart City plan represents a strategic investment, and an ambitious program for the city seeking to address public issues via ICT-based solutions, on the basis of a multi-stakeholder, municipality-based partnership. The methodology applied consists of some key logical steps to be taken. The key 6 steps identified are:

1. Creation of a vision

2. Definition the objectives

3. Description of the initiatives to reach the objectives

4. Outline of the priorities

5. Creation of a roadmap

6. Check the capabilities and resources (budget, people) as needed

This document covers the first 3 steps of this strategic plan. A detailed selection of the priorities, the roadmap and budgeting exercise will be done in the second extended phase.

Besides the methodology described above, the following key elements have been covered to document and back up the vision statement:

- In the contextual chapter we describe the overall international and national trends of cities to deploy and implement smart city programs.

- Running and managing programs requires the "measurement of success", or a definition of the key performance indicators based on which one can have visibility over when and how the target is reached.

- This extensive program not only has successes, but also potential pitfalls and could be endangered. The best way of dealing with these challenges is to proactively mention them and introduce risk mitigating actions.

- Finally, based upon the experience of the authors in running and observing smart city programs, some important recommendations and guidelines are included, which should be taken into account during the project life cycle.

This leads to the next chapters

- Vision statement
- Smart city international and national context
- Key initiatives
- Key "enabling" initiatives
- The final masterplan
- Measuring success: KPIs or metrics
- Risk management
- Conclusions and recommendations

Vision statement

Digital Transformation Chisinau 2030

The Vision Statement describes the city's purpose, what it is endeavoring for, and what it wants to achieve. It focuses on short-term, mid-term and long- term milestones related to what the city wants to ultimately become, reflecting the desired future positioning.

It is finally **the execution of the Digital Transformation Chisinau 2030 plan itself** that will ensure that the vision is reached.

The vision statement for Chisinau Smart City 2030 is:

Chisinau will offer for its citizens in a sustainable* way the highest quality of living, and the best entrepreneurial climate, through innovative smart** solutions.

Highest quality of living

Best entrepreneurial climate

Innovative Smart Solutions
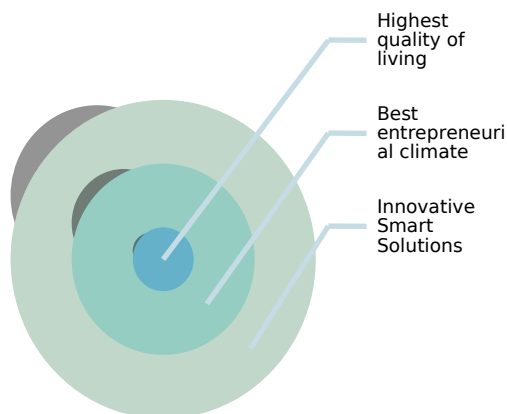
A sustainable way in different dimensions:

- Ecologically sustainable really means that it fits the international, national, and local commitments to the green agenda.
- Financially sustainable means that it is according to a balanced multi annual budgetary plan, as agreed by the council and the citizens.
- Socially sustainable means that it covers all citizens and assures an inclusive society.
- And democratically means that it has been planned, decided, and executed by all stakeholders in a participative manner.

- Innovative smart solutions:
- Innovative smart solutions refer to the applied usage of ICT technologies, from a connectivity point of view, applications point of view, and most importantly bringing real value-added services for citizens and businesses.

Context

International and national programs

Smart city is a concept and buzz word, already propagated for more than 10 years. The actual status and experience which several cities, governmental associations, and international initiatives have acquired give a strong weight to the meaningfulness of such a program for Chisinau. After these initial years of different programs, they have taught us to structure the approach, to focus on the objectives, and to learn from concrete work practices.

Here are some clear references on international and national level to consider and learn from.

International programs

EU Smart City Programs (OASC, EIP-SCC)

Open and Agile SMART Cities (OASC) is a non-profit, international smart city network that has as its goal creating and shaping the nascent global smart city data and services market. OASC is already at the forefront of tomorrow's standards for city data, services, and technology – and work based on city needs with support from industry. OASC is driven by implementation and focused on open platforms and citizen engagement. OASC is growing rapidly and connects 117 smart cities globally organized in national networks from 24 countries and regions.

European Innovation Partnership on Smart Cities and Communities (EIP-SCC) is an initiative supported by the European Commission to bring together cities, industry, SMEs, banks, research and other smart city actors. Six Action Clusters have been set up in the EIP-SCC: (1) Sustainable Districts and Built Environment, (2) Policy and Regulations/Integrated Planning, (3) Integrated Infrastructures and Processes (including Open Data), (4) Sustainable Urban Mobility, (5) Business Models, Finance and Procurement, and (6) Citizen Focus.

EIP-SCC counts more than 5.000 members from over 30 countries.

Digital Compass: The European Way for the Digital Decade

The EU will pursue a human-centric, sustainable vision for digital society throughout the digital decade to empower citizens and businesses. The Digital Compass is setting out digital ambitions for

the next decade in the form of clear, concrete targets. The digital compass uses the four (4) points of the compass to identify the main goals to reach over the next decade: (1) a digitally skilled population and highly skilled digital professionals, (2) secure and sustainable digital infrastructures, (3) digital transformation of businesses, and (4) digitalization of public services.

Green Deal

The **Green Deal for Europe** is a roadmap to ensure the sustainability of the EU economy. This will be ensured by turning climate and environmental challenges into opportunities in all policy areas and ensuring that the transition is inclusive and fair for all. As part of the Green Deal, European countries are committed to: (1) zero greenhouse gas emissions by 2050, (2) economic growth to be decoupled from resource use, and (3) no individual or region is left behind.

National programs

UNDP Moldova: Moldova Sustainable Green Cities

The **Moldova Sustainable Green Cities** is an UNDP Moldova project for 2018-2022, implemented in common effort with the Ministry of Environment, Ministry of Infrastructure and Regional Development, Municipality of Chisinau, Energy Efficiency Agency, Technical University of Moldova, E-Government Agency. The beneficiary of this US$2,838,140 project is the Chisinau City Hall. It focuses on Climate Change, Environment & Energy.

The objective of the project is to catalyze investments in low carbon green urban development based on an integrated urban planning approach by encouraging innovation, participatory planning and partnerships between a variety of public and private sector entities.

The project will support the design, launching, and establishment of the Green City Lab (www.greencity.md) to become the leading knowledge management and networking platform, clearing house, an inter-mediator of finance and a source of innovations and expertise to catalyze sustainable low carbon green city development in Moldova with a mission to transform Chisinau and other urban centers in Moldova into modern green and smart European cities with improved quality of life for their citizens, while also demonstrating opportunities for sustainable economic growth.

The project's objectives:

- To catalyze investments in low carbon green urban development based on integrated urban planning approach;
- To encourage innovation, participatory planning, and partnerships between a variety of public and private sector entities.

World Bank and E-Governance Agency: Governance e-Transformation Project (GeT)

The **Governance e-Transformation Project** was a WB/GoM initiative implemented during the 2010-2016, with a budget of US$23,000,000. It covered Central Public Authorities and attracted as co-partners USAID, UNDP Moldova, SOROS Foundation Moldova, Dutch Government, Estonian Government.

The project covered two components**:**

- e-Leadership Capacity and Enabling Environment. This component was designed and implemented to provide support to the E-Government Center that was established to drive Government-wide e-Transformation agenda. Support was also provided for e-leadership training and civil servants capacity building; strategic communications and partnerships; development of policy, technical, legal and regulatory frameworks; and project management.
- Shared Infrastructure and e-Services Development. This component was designed and implemented to provide funding for: (a) establishing and implementing the M-Cloud (Government Cloud Computing Infrastructure); and (b) developing a selected number of e-Government services and shared applications to be delivered through multiple channels, including government portals and mobile phones.

World Bank and E-Governance Agency: Modernization of Government Services Project (MGSP)

The **Modernization of Government Services Project** is a WB/GoM project for 2017-2022 with a US$22,430,000 budget, designed as a continuation of the GeT project. It covers the Government of Moldova (GoM), Central Public Authorities, and Local Public Authorities.

While the first Phase of the Government e-Transformation project was focused on putting in place the core ICT infrastructure (both

hard infrastructure in form of a Cloud and a range of e-services, and soft infrastructure in terms of capacity and enabling frameworks), the second phase is focusing on deeper institutional reforms in public sector governance as made possible through the now existing ICT infrastructure. The second phase is building on the achievements of the first phase by further expanding the use of the Cloud technology, leveraging developed e-Services (both enablers and topic-specific), and building on first experiences gained in the re-engineering of public sector service delivery as made possible using ICT technology. MGSP project aims at advancing deeper, institutional reforms through a more comprehensive re-engineering of internal workflows in the public administration based on the use of digital technologies and the offering of e-services, engage in a review of staffing implications as resulting in the use of more efficient ICT technology, and take this as a starting point to also review a range of more general public sector reform management and coordination activities.

Phase II of the project includes the following components:

- Component 1 – Administrative service modernization: Business process re-engineering; Reform management and coordination; Expanding access points for central government services.
- Component 2 – Digital Platforms and Services: Digitization of services that went through business process re-engineering; Strengthening e-services infrastructure; Standardization of IT Management; Cybersecurity and privacy.
- Component 3 - Service delivery model implementation: Staffing review; Capacity building/training - for process re-designing and innovation; Strategic staff planning and job descriptions for new service delivery.
- Component 4 – Project Management: Cooperation for improved services delivery; Citizen outreach for modernized services.

EU Delegation and UNDP Moldova: EU4Moldova: Focal Regions (Cahul and Ungheni Municipalities)

The **Focal Regions Project** is an EU Delegation/UNDP Moldova US$25,888,889 initiative covering 2019-2024. The beneficiary of the project are Ungheni and Cahul municipalities of, as well as the neighboring communities.

The EU4Moldova: Focal Regions Programme is focusing on strengthening the economic, territorial, and social cohesion in the

Republic of Moldova through facilitating inclusive, sustainable, and integrated local socio-economic growth and improving the standards of living of the citizens in two focal regions: Ungheni and Cahul. The programme supports the two regions targeting necessary improvements in three areas: at the level of government – to improve the necessary services and the needed infrastructure, at the level of private sector – to stimulate private investment, improve the economy and create employment opportunities for the men and women; at the population level – to strengthen citizens participation in democratic governance processes and strengthen their capacities to demand their rights.

Objectives of the project:

- To strengthen transparency, accountability of local public authorities and citizen participation in local governance processes in the focal regions;
- To improve citizens' access to quality public services and utilities in the focal regions;
- To create employment opportunities for men and women in the focal regions and improve the attractiveness of the focal regions for investors and entrepreneurs;
- To promote the smart specialization of the economy of the focal regions through the development of the clustering and value chain approach in key economic sectors.

Case Studies

Romania: Cluj

The city of Cluj has embarked on a smart city program - https://digitalcluj.fspac.online/. The challenges and ambitions of both cities are mostly similar and case study was very helpful.

UK: London

London has a long history of smart city. It is an interesting reference to see the renewed attention by the mayor, and the importance of stakeholder engagement.

https://www.london.gov.uk/sites/default/files/smarter_london_together_v1.66_-_published.pdf

Sweden: Stockholm

Stockholm, always very progressive as a city from an innovation point of view, describes well the 4 dimensions of sustainability as key guidelines for a smart city project.

https://www.london.gov.uk/sites/default/files/smarter_london_together_v1.66_-_published.pdf

Digital Transformation Framework

Intro

A digital transformation program has many dimensions and is a long-term program with long lasting effects . It is therefore of utmost importance to have a clear framework to explain, understand and scope the program. For the City leaders, this represents a good model to understand, agree upon and execute the digital transformation strategy or roadmap. It will enable Chisinau to transform as a City to meet its future challenges and deliver its future aspirations.

The framework as proposed is based upon the experience of other smart city programs and it is focused on the enabling processes**,** (actions, and/or supporting initiatives) by which the innovative use of technology and data, together with organizational change, can reach the final objective and help deliver the Vision for Chisinau City in more efficient, effective, and sustainable ways.
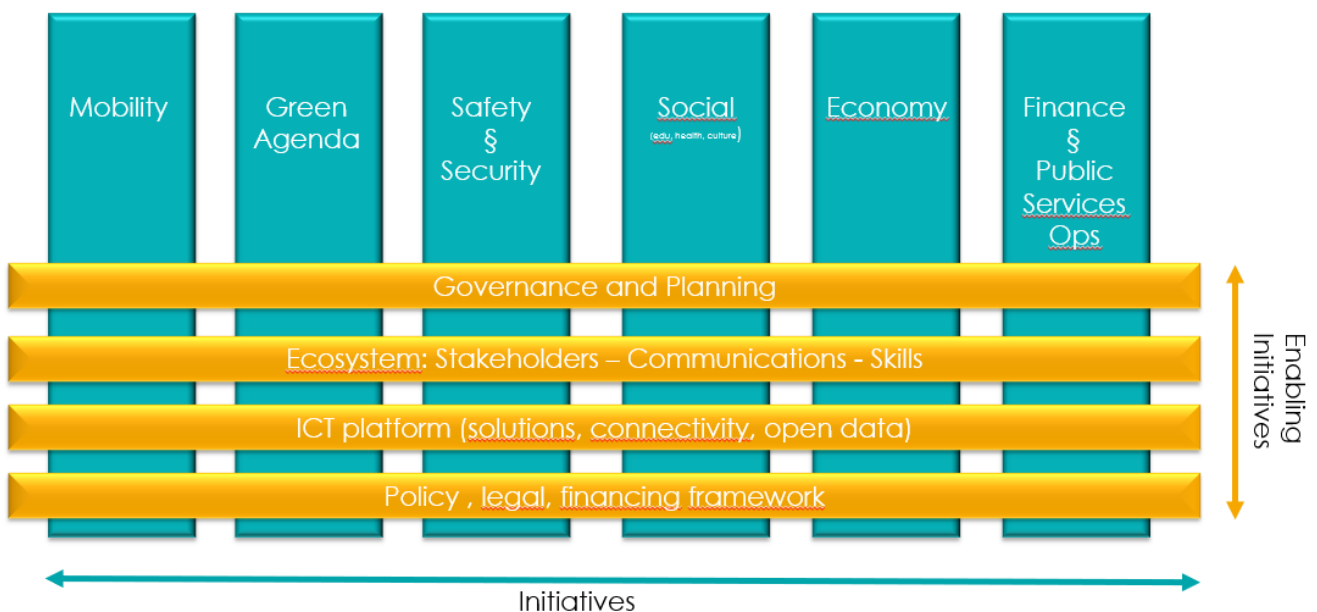
Initiatives

The pillars on the diagram reflect the initiatives. These are domains of activity, under the control of the city, which have a logical coherence. They are often also under a specific responsibility of a deputy mayor, or department within the city hall. Within each initiative several projects should be launched, with specific deliverables, timeline, budget, and outcomes.

We have identified, for the moment, 6 core "initiatives" or "domains" where the Chisinau smart city 2030 program must focus on to achieve the final objective.

- **Mobility**

Mobility includes the overall agenda for citizens/businesses to move and operate smoothly, ecologically, and respectfully for the livelihood of the city. SMART Mobility is improving local, national, and international accessibility, through the provision of a well-organized transport system and excellent availability of supporting IT services . It includes public transport, cars, traffic management, bicycle and pedestrian support, and parking management.

- **Green Agenda**

The Green agenda covers all measurements, actions to help the city in being energy consumption effective, being ecologically correct, and take care for soil, water, and air to reduce pollution. It also covers waste management and the ambitions for a circular industry.

- **Safety & Security**

Safety and security cover the "citizen" safety agenda, the overall well-being and sense of protection. It includes monitoring and in case of emergencies, the best organization of support services. As a special attention point, in a "digital world" it focuses also on cyber security threats and protection.

- **Social**

The City has direct responsibility in offering services for the social agenda of the citizens. Most importantly are the educational system (schools, kindergarten), the health systems (hospitals and primary care), the cultural sector (museums, theater, etc.) and individual social programs.

- **Economy**

As a core objective of the "Digital Transformation Chisinau 2030 program" prevails also the ambition for an " entrepreneurial climate" within the business sector. As such the specific actions and

projects should be bundled which focus on this. This mostly includes the avoidance of red tape and offering in a digital way online services and data as needed.

● **Finance & Public Services Operations**

The city hall administration and processes should be optimized to support citizens and businesses. All activities, actions, projects which ambition to digitally transform the city hall are bundled within this initiative. This includes the financial management of the city, the ICT service delivery and the offering of online services.

If during the lifecycle of the Chisinau smart city 2030 program specific new , or re-grouping of activities could be beneficial, then these initiatives can be regrouped or added.

Enabling initiatives

Initiatives are key programs, projects which offer "value" to citizens and businesses.

However, these programs can only be executed when they are supported by "enabling initiatives". The 4 enabling initiatives as identified are:

● **Governance and Planning**

The complexity and multi-dimensional nature of digital transformation programs do require an explicit and clear governance structure. This governance will also need to plan, and iteratively adapt targets/content and timelines of the programs.

● **Ecosystem: stakeholder management, communications, skills**

The ultimate success of digital transformation programs only materializes when the user, the citizen, the businesses participate, use and comment on the services offered. Furthermore, these programs should be explained, communicated and discussed with these stakeholders. Within the same context, the inherent ICT maturity of these users should be boosted with a targeted skills campaign. All these initiatives are bundled under the "ecosystem" definition

- **ICT platform (solutions, connectivity, open data)**

As stated in the vision, these outcomes are realized by innovative smart solutions. Experience has taught us that a coherent ICT strategy, based upon ubiquitous connectivity, internet, open data, and modern applications (mostly cloud based) are essential for the uptake of smart city programs.

- **Policy, legal, financing**

Last but not least, new forms of legislation – including public private partnership, and new procurement models - will be needed to engage different stakeholders in the realization of the objectives. Also, local regulatory frameworks need coherent adjustments. A special attention should be paid to develop national and local financial capacities, as well as to attract private and international resources to reach the objectives.

Mobility

Ambition

The clear ambition is to boost the mobility of the citizens in Chisinau in an ecological, budgetary, and social way. This ambition is supported by a Sustainable Urban Mobility Plan (SUMP)

Objectives

Mobility plays on different levels. It is closely related to the urbanistic planning, and architecture of the city (roads, bus or bike lanes, pedestrian areas, public places, parking places etc.). It also includes the provisioning of public transport by the city, and the overall multimodal transport capabilities to be provided.

Urbanization will need to include a correct parking strategy, and readiness to host electric cars in the near future. The fluidization of road traffic and avoidance of traffic congestion is a high priority to be taken into consideration.

Within this spectrum of objectives, some highlights could be given:

- Realize smooth intercity and intracity mobility solutions
- Change mindset of citizens for alternative ways of transport
- Optimize public transport offering and quality : further acquisitions of new buses and trolleys, e-ticketing etc.
- Reduce overall car traffic, avoid traffic jams and improve fluidization
- Develop multimodal transport facilities
- Boost pedestrian and cycling adoption and adopt public transport and biking lanes/roads
- Reorganize and optimize street parking, and optimize and extend parking housing facilities

Digital transformation initiatives

Digital transformation projects are characterized by the fact that smart innovative usage of ICT helps in reaching these mobility goals. Several initiatives have been undertaken already within

Chisinau as part of the SUMP program. These initiatives should be assessed, prioritized, and further developed or deployed.

Good examples of potential mobile initiatives are:

● **Central traffic monitoring and management system**

This will allow a dashboard view on the status of mobility within the city.

Detailed information about traffic density, people density, and public transport occupation will be consolidated. The feature to optimize the fluidization and management of traffic lights, based on instantly collected data is important.

● **Public transport information system**

This system allows travelers and citizens to have direct insight into the availability and arrival of buses and trolleys. Insights given at the waiting stations , or via mobile apps.

● **Public transport e-ticketing system**

A central ticketing and payment system covering all public transport facilities (buses, trolleys, trains), and seamlessly integrated with actual mobile technology.

● **Centralized parking management system**

Car parking occupation and direction systems, informing car owners where to park most efficiently their car.

● **Electric car charging systems**

Implementation of charging stations, integrated into the overall central parking management.

The portfolio of projects can still be extended and enhanced during the program period.

Project status graph

Several of these projects have been analyzed, studied and some of them have been even tested as pilots. It is important to assess the maturity of the concepts, and plans, and clearly decide on their implementation scenarios and planning.
The next scorecard model gives a qualitative indication of the maturity of these programs. This scorecard will be used within all the initiatives.

- Identified
- Planned
- Pilot
- Roll out
- Mature

Score card

Central traffic monitoring and management system

Public transport information system

Public transport e-ticketing system

Centralized parking management system

Electric car charging system

Challenges and conditions for success

During the pilots and the first try outs, several challenges have been identified which should be approached and solved in a proactive manner. Deeper learnings and insights from other city cases have shown us some important criteria for success.

Challenges:

- Technical level of traffic lights (programmable or not)
- Technical level of buses and trolleys (communications)
- Agreement with the Ministry of Interior on monitoring system access
- Data Protection/Personal Data issues

Conditions of success:

- Need for a global mobility plan – too many interdependencies
- Stakeholder engagements with transport agencies, parking areas holders, police, and citizens
- Diversification of financing with sponsors, private companies, and private investors.

Green agenda

Ambition

The ambition of the Chisinau smart city 2030 program is to apply smart technologies to improve the energy efficiencies, clean energy production, create a circular economy, and monitor the ecological impacts. Increasing urbanization put Chisinau as the capital city under environmental, economic, and social pressure. Digital technologies are the enablers to reach the goal of sustainable growth and increased liveability. Moldova is committed to accelerated achievement of 2030 Agenda for Sustainable Development under the Association Agreement with the EU and has jointly and accepted the COP-26 sustainability and climate conference conclusions. This will be a big driver for Chisinau to contribute as a main city to the national commitments.

Objectives

The sustainability agenda, and the climate protection agenda with clear CO2 footprint targets includes numerous domains of activities and application domains. It also covers domains under the direct control of the city hall, but also in the private sector, or the utility sector companies. A right and realistic target setting will be required. Some clear highlights can be indicated which fall within this objective:

- Continue to develop a conscious waste management strategy
- Launch renewable energy initiatives
- Building energy efficiency programs for public buildings
- BÎC river initiative

Digital transformation initiatives

ICT is a key enabler of introducing innovative and smart solutions which contribute to the Green agenda. Fundamental in the achievement of the results is to be able to monitor the impact on air, water, and soil, and to introduce smart metering in the consumption and production of energy. Additionally, concepts like smart buildings, or smart lightnings will help, and are intrinsically related to the usage of ICT technologies.

Some of the most obvious smart projects:

- Roll out of monitoring systems on air, water, and soil quality
- Roll out of smart metering systems (gas, electricity)
- Intelligent buildings and smart lightening (energy optimization, multimedia)
- Enhancement of waste management systems (measure and control)
- Roll out smart charging systems for cars

The portfolio of projects can still be extended and enhanced during the program period.

Project status graph

Most of the Green initiatives are still in their concept phase, apart from some tangible progress in the waste management arena.

- Roll out monitoring systems
- Roll out smart metering
- Intelligent buildings and smart lightening
- Further enhancement of waste management
- Roll out charging stations

Challenges and conditions for success

Challenges:

The Green agenda suffers under the right priority setting, and the large upfront investments needed, without often clear and direct financial incentives. Furthermore, some historic legacy slows down the ambitions. Some of the key challenges observed:

- Large public buildings consume a lot of energy and are as such heavily contributing to the carbon emissions
- Energy efficiency , energy production and distribution require major investments and joint ventures with building promoters, private sector, utility companies.
- As this agenda touches the overall societal organization, joint action plans with the different players and stakeholders is essential.

Conditions of success:

- Stakeholder engagement (citizens, building companies, utility companies, private companies).

- Smart buildings and the smart utilities should come together to ensure a paradigm shift on how public spaces are designed, built, used and sustained

- Intensive public-private partnerships (co-investments)

- Correct legal and policy framework

- International cooperation agreements and sponsorships

- These are indicators on what it is known at this stage and what could be fine-tuned and correctly benchmarked as the right indicators jointly with the Chisinau Municipality Team.

Safety & Security

Ambition

It is the ambition to offer the citizens in Chisinau a safe and secure environment, as a key ingredient of quality of living. Part of this is also the trust in the public authorities to provide the best emergency service, in case it is needed. In a lot of smart city programs worldwide "feeling secure" is one of the highest comfort elements which citizens aspire to, and it is a core obligation of the public authority to offer this.

Objectives

Urban safety and security in today's digital world should be applied to the physical status of individuals in daily life, but also in the virtual world. The metaverse, as baptized now, will always be part of our lives and as such it should be included in these objectives. Chisinau must facilitate innovation and needs to adapt to use of security related technologies in compliance with modern legal requirements and European ethical principles in this field.

As a summary of these objectives, following statements are recommended:

- Make Chisinau a safe city for its citizens
- Organize the best emergency services in case of need
- Create a cyber secure infrastructure and services environment

Digital Transformation initiatives

The usage of smart solutions and ICT plays a key role in this objective. Several technologies like camera's, lightning, traffic corridors, alarm systems are available to help achieve this goal .The introduction of smart solutions in the city will also invoke the importance of a clear cybersecurity strategy in balance with privacy, especially with the advance of IoT, AI and biometrics. Within the context of Chisinau, 3 key projects of immediate importance were identified:

- Central "automated" monitoring system of CATV cameras for urban supervision and prevention.

- Traffic monitoring and steering system in case of emergencies
    - o Optimized emergency system- corridors (information, interaction, remote assistance)
- Cybersecurity awareness and management program
    - o Central SOC deployment

Project status graph

The actual maturity model of safety/security projects looks:

- Automated camera monitoring system
- Optimized emergency "corridor" and "assistance" system
- Cybersecurity program and SOC

Conditions for success

The domain of urban safety and security is directly tied to the responsibilities of the Ministry of Interior, and police. A coordinated approach and joint program should be developed to assure the required outcome.

As part of this collaboration , some conditions of success have been identified.

- Agreement with MoI around camera management systems and other technological solutions for prevention (drones, AI, etc.)
- Stakeholder engagement with key actors in safety and security in the city like police, emergency services, hospitals, security agencies
- A cybersecurity master plan and security operations center

Social

Ambition

The City Hall action radius is quite vast in relation to the social agenda. Under the social responsibilities it should be included: social welfare of citizens (social contributions, support), education in schools and kindergartens, primary care, and hospitals, and also the broad sport and cultural sector. All existing services of the city to the end-users of these services should be ameliorated and facilitated better, thanks to the use of IT technologies. Responsiveness, reduction of paperwork, availability and insight are key ingredients of a successful digital transformation.

Objectives

Core objective is to enhance the service delivery in the different institutions of the city. Some key examples as mentioned:

- Clear introduction of online services as part of the service delivery (reduction of red tape)
- Global acceleration of digital adoption by all users
- Introduce global payments systems (from end- user to city, and from city to end-user). This applies to schools, kindergarten, care, museums, facilities
- Introduction of social security cards, optimizing service delivery, monitoring and management
- Introduction and usage of health record systems for primary care, lab results, hospitals
- Global appointment systems
- Creation of Hospital information systems for managing care
- Cultural/sport information portals, reservation, and payment systems

Digital Transformation initiatives

Most of the previously mentioned generic objectives have very strong correlation with the usage of communications and information technologies. As a summary it could be stated that these social sectors will benefit mostly from the digital transformation of the services.

Part of the objectives as mentioned above, could be further made explicitly by mentioning smart solution profiles.

- Enablement of payment systems by the adoption of the MPay modules as built by the E-Government Agency. This is the shortest and most effective way to make progress
- Gradual introduction of a citizen identity management strategy. Besides the e-ID cards, and Mobile identity management systems, further extensions like the usage of a citizen cabinet or of smart cards features could be very beneficial.
- A common strategy in between the national Health authorities and the local public authorities to homogenize and execute on the health record and HIS ambitions.
- A quick win to deploy primary care, or school appointment systems
- Renewed and re-organized IT support services to all agencies within the social sector, exploiting the benefits of cloud-based applications, and generic interaction devices (mobile phones, laptops, etc.)

Project status graph

Most of the projects have been clearly identified but are still in a start-up phase.

Payment and identity management systems could benefit from the core services as developed by the EGA .

- Payment systems
- Identity management system
- Health record systems
- Social security card system
- Primary care appointment system
- Standardized IT Support (centralized help desk, cloud etc.)

Conditions for success

The complexity and variety of application domains in the social sector do require a vast amount of attention to be paid to the full environment, and usage patterns. For that reason, some important conditions of success can be mentioned:

● Stakeholder engagement

The social agencies are the key examples of services which are consumed and used by a large variety of end-user profiles, citizens, doctors, social assistants, teachers etc.

From that perspective, a key condition for success is stakeholders' engagement.

● Service integration

Furthermore, they use these services, mostly as an integrated and mutually interdependent offering in between the local authorities and the national authorities. Typical breakthroughs would happen in the area of social benefits (social security cards) and health treatments (primary care, hospitals - health record, HIS) if and only if governance, regulations and systems are co-designed and solutions offered.

● Digital education

Digital literacy, awareness, and knowledge should be created with all the citizens. Schools have a crucial role to play here. The concentrated national action, initiated by TEKWILL, is a rich source of content to be included in educational programs and adoption scenarios. Close collaboration will help here.

Economy

Ambition

The core ambition of the Digital transformation Chisinau 2030 program is the wellness of the citizens, and the competitiveness and entrepreneurial climate of its businesses. The prosperity of economic activity is a crucial element in the objective setting of the Digital Transformation program. For that reason, the initiatives and projects considered should be aligned with the ambitions of the business community, a joint dialogue should be established, and definitely the city should offer the right online services to make "doing business" or "creating businesses" a seamless activity.

Objectives

A core objective is to reduce red tape for the commercial/industry players, and to offer a platform for the entrepreneurs to access/exchange information, and to apply for local public services.

Some explicit objectives as highlighted:

- Create structured communication channel in between business and local public authority
- Reduce paperwork and red tape in servicing businesses
- Actualize and offer as online service the core local public registries
- Create poles of innovation within center of Chisinau
- Involve private sector in major investments

Digital Transformation initiatives

ICT and technology play a crucial role in enhancing the business climate.
Online public services will make a big difference for the City Hall. The exploitation of open data could generate a number of new services and will offer new activities and services to potential investors, operating businesses and startups. Key identified projects:

- Creation of local platform for B2G(business to government) dialogue and information sharing
- Roll out of online local public authority services
- Improve and extend the use at municipal level of key public

registries on land, property, acquisitions etc. as well as the development of local digital public services and resources.

- Creation of innovation poles in downtown city (connected, multimedia etc.)
- Further develop the tourism industry by information portals and applications

Project status graph

The maturity of the back-office processes of the city, and the availability of the online services and open data are key indicators of the progress of the "economic" initiative.

- B2G platform creation
- Online local public services
- Access to key registries (open data)
- Creation of innovation poles
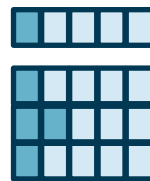
Conditions for success

The most important condition for success is to create the right platform of dialogue, discussion, priority setting and co-creation in between the city and the commercial/industrial players. From that perspective, most of these conditions refer to stakeholder engagement, and new joint financing or co-operation models. Some clear conditions:

- Stakeholder engagement business forum
- Successful launch of PPP model and 60 major investments proposals
- Commercial licensing and policy framework
- Open data policy

Finance & Public Services Operations

Ambition

The ambition of the City Hall is to boost the efficiency and effectiveness of the public service operations to all stakeholders.

In general, this is the digital transformation of the back-office of the city hall, and the organization of the ICT service governance and offering to all the different agencies. This initiative is a core initiative to help and enable all the other initiatives. A core service offering could be a digital citizen passport.

Objectives

- Transform digitally City Hall operations and provide financial resilience
- Reduce paperwork and gradually introduce online LPA services
- Standardize and structure IT service delivery in all City Hall agencies

Digital Transformation initiatives

There are several different projects which are tightly coupled to the availability and transformation power of ICT technologies. As technology plays a crucial role, this also includes the ICT directorate, and the way ICT support is organized on a city level. The immediate "smart" projects are:

- Operate new IT governance model (IT directorate)
- Create online public services roll-out plan
- Develop City Hall front-office portal (single window)
- Renewed financial back-office
- New document management system
- New core registry systems and integration with national registries
- Open data partnership model
- Infrastructure roadmap (network, security, cloud, desktop, mobile)
- Digital citizen passport and/or payment service

Project status graph

The creation of the IT directorate and some of the core activities already deployed are the first good examples of the digital transformation.

- Operate new IT governance model (IT directorate)
- Create online public services roll-out plan
- Develop City Hall front-office portal (single window)
- Renewed financial back-office
- New document management system
- New core registry systems and integration with EGA
- Open data partnership model
- Infrastructure roadmap
  (network, security, cloud, desktop, mobile)

Conditions for success

The digital transformation of the city hall is a major transformation program, which involves end-users, service providers, ICT experts, and most probably new financing models. As such it will require a real change management approach to be successful and will be an on-going program.

Some of the key conditions for success:

- Adoption of IT governance model
- Stakeholder engagement (all users of services)
- Developers' community for open data projects
- Practical IT services outsourcing strategy
- Structural financing and multi-year budget approval
- Cultural and organization change program

Governance & Planning

The successful execution of the Digital Transformation Chisinau 2030 plan will require a consistent, focused, and explicit governance model and planning process.

The correlation of the successful execution of projects with the management of these projects is extremely high.
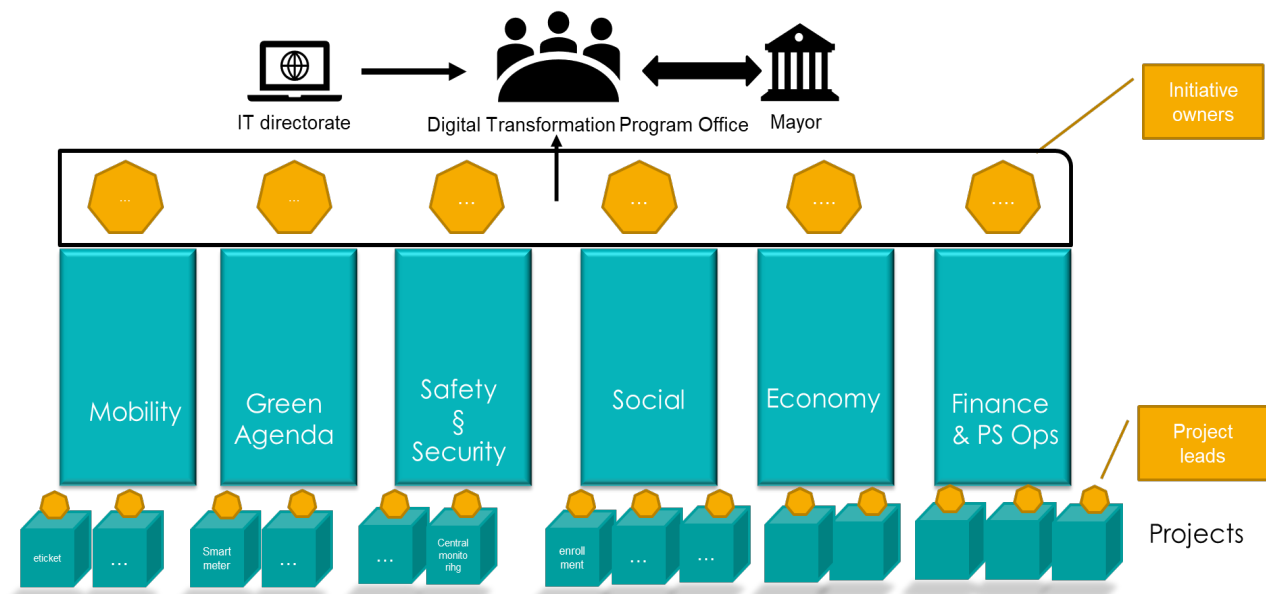
The first level of management deals with the "projects" themselves. These projects fit within an initiative (mobility, green, back-end etc.) and have a clear scope and target outcome. It is important to clearly appoint and empower the project leaders for these separate projects.

Projects support a "initiative", and as such they are consolidated under this initiative to contribute to the overall ambition. For the larger scope of managing the Digital Transformation agenda all the initiatives are core for the final success. From that perspective, the governance model proposes to have an "initiative owner" who overlooks the different projects within this domain. The initiative owner can consolidate the results, pay attention to cross-over benefits, indicate dependencies, put the right priorities and align the projects. As such an "initiative owner" is a real "role" within the

city hall Chisinau Digital Transformation 2030 program. This role can be assimilated by a dedicated person, a deputy mayor or an external "empowered" expert.

Initiative owners form "together" the Digital Transformation 2030 program. They meet together in the Digital Transformation Program Office (DTPO). This office de facto reports into the mayor, to have a direct link with the executives. The ICT board, as a main expert contributor for the fulfillment of the Digital Transformation program, is a fixed member of the DTPO.

Dedicated "experts" could be added or invited occasionally to this program office.

The internal processes, roles & responsibilities of all stakeholders in the DTPO are defined in a clear RACI model, this means a clear indication as "Responsible, Accountable, Consulted or Informed" member.

It is recommended as part of a successful trajectory to include these aspects related to governance and capabilities (the people and skills needed) to carry out the program.

Ecosystem

Stakeholders – Communications – Skills

Digital Transformation programs require a very broad engagement of different stakeholders. From a pure "service consumption" or beneficial point of view, the key target stakeholders are the citizens, from young to old, from engaged to socially supported, and the businesses. The core business of the City Hall is to offer best living conditions and services to these key stakeholders. This is also clearly reflected in the vision statement of Chisinau Digital Transformation 2030.

As part of the fulfillment of the ambition of this program attracting new stakeholders and activation of new external sponsorships should be contacted and consulted. The ambitions of the program are of this order that international government programs could be involved, as also private investors. Especially highly capital demanding projects in energy efficiency, consumption or smart building initiatives do require external sponsors and investors.

Most of the services, which will be offered in an innovative way, thanks to the usage of ICT technologies, will be based upon contributions of different governmental agencies on a national level (social, health, security, etc.), different agencies like police , emergency services, or the e-government agencies. Online services are most effective as they do allow to "integrate" this service delivery and optimize the bureaucratic process (red tape). From that perspective all these agencies are crucial stakeholders to make the Chisinau Digital Transformation 2030 program effective.

Digital literacy, digital awareness and knowledge are the cornerstone of the program. The scholar system can heavily rely upon the content creation, as provided by Tekwill or other similar players. Exploitation of the data, as residing in national or city registries can be exploited by developers in creative startups, or renown actors. All these "experts" are key stakeholders to engage in the execution of the program.
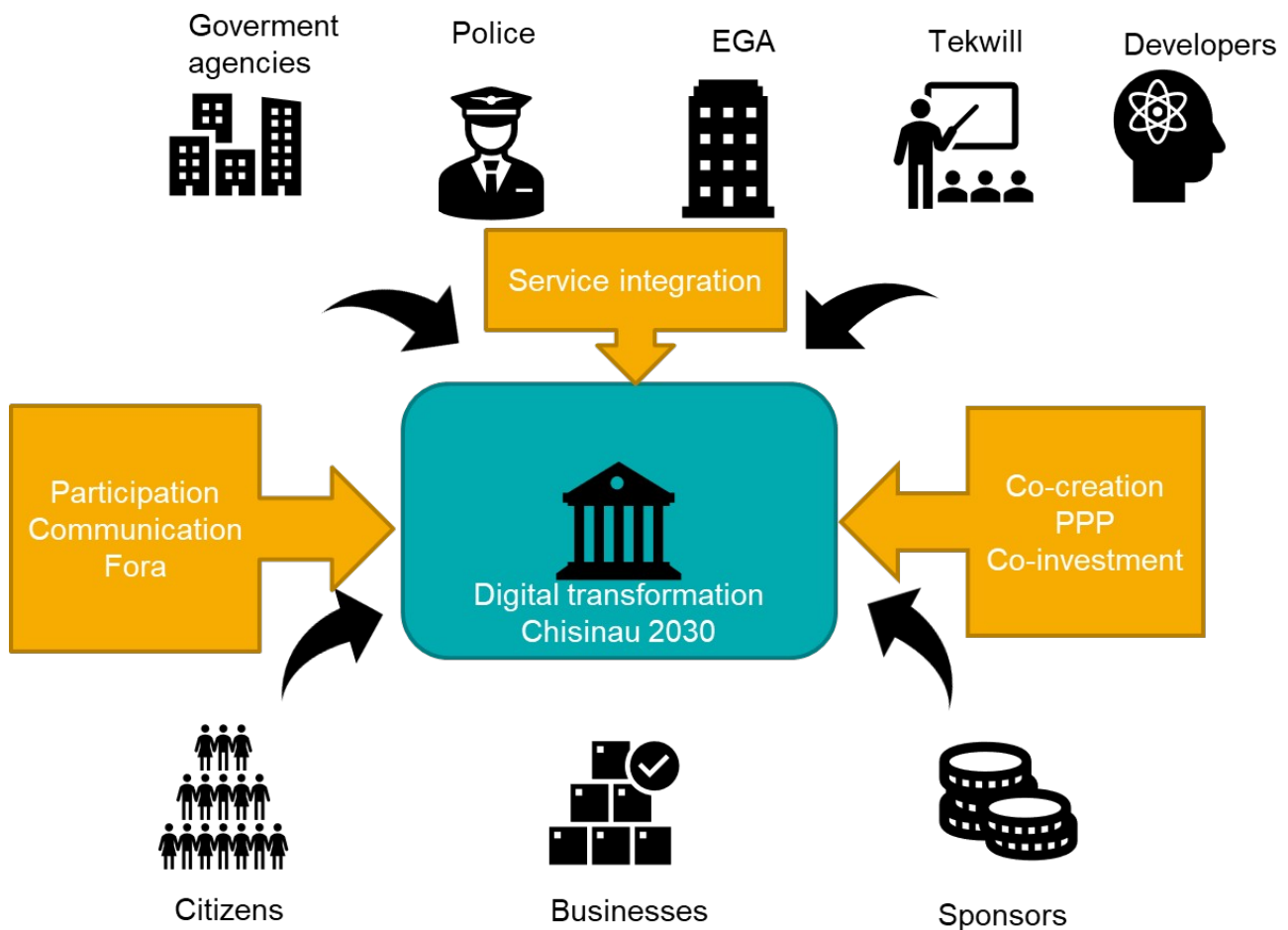
The "engagement" of all these actors "citizens, businesses, sponsors, agencies, technology providers" require a specific program attention: stakeholder management. This management starts with a clear transparent communication plan, dedicated information sessions and information portals, multidisciplinary project engagements, and new contracting models like public private partnerships.

A careful analysis of other Digital Transformation programs clearly indicates the importance of this aspect of the program. It could be considered to have a sound communications program and key responsibility as part of the DTPO.

ICT platform

Solutions, connectivity, open data

The vision statement clearly indicates that the "smart" dimension comes from the innovative smart solutions, based upon the creative usage of ICT technologies.

It is therefore of utmost importance to pay correct attention to the "platform" which needs to be created to offer these smart solutions. A platform is the combined offering of networking, computing , and application development models which allow a consistent, open, and future proof services model.
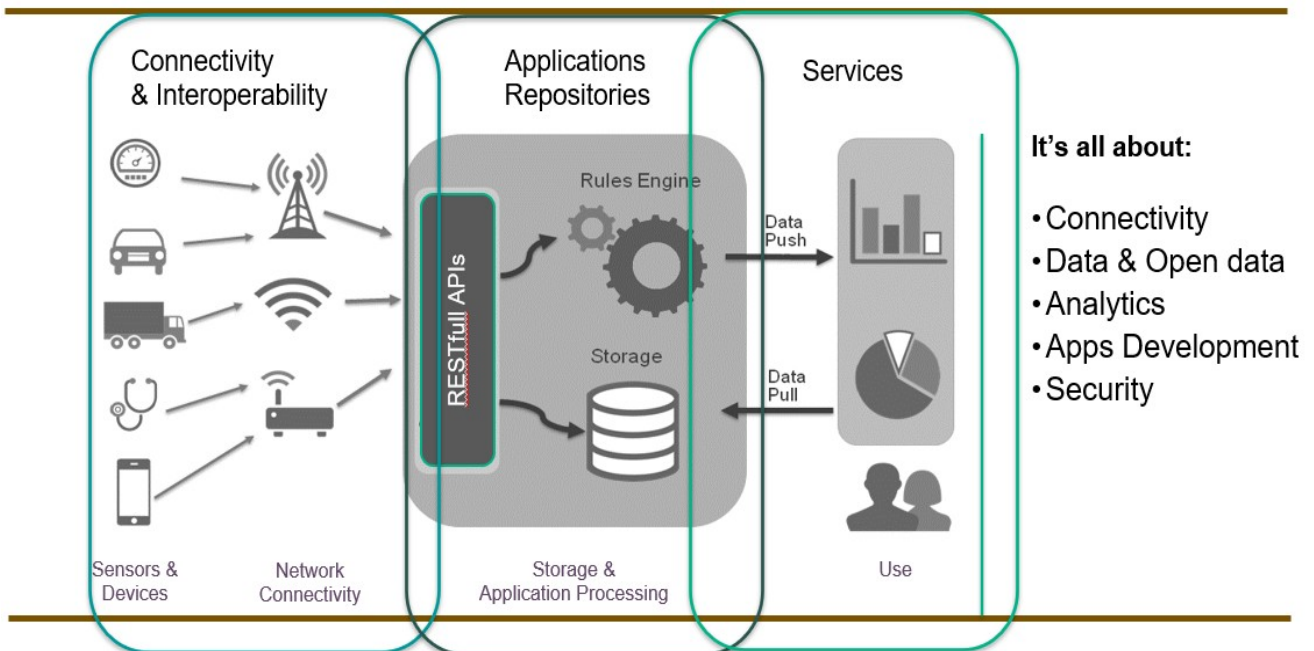
Key ingredients of the ICT platform could be summarized into solutions, connectivity and open data.

● **Solutions**

The ultimate goal is to offer to end-users services, or applications which really benefit them in their usage. These solutions range from reservation services, ticketing services, information services, payment services, monitoring services etc. They are offered in a very flexible way, on mobile phones, laptops and PC's or information kiosks or terminals. Information can be retrieved or

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entered in a user-friendly way. The architecture of these software applications has to adhere to new insights into software, and apply cloud native programming concepts, open API's (application programming interfaces) and open-source licensing models.

● **Connectivity**

Thanks to the internet, today's world allows ubiquitous connectivity (everywhere, always). In general, this connectivity can be summarized as the availability of high-speed internet (fiber based, even the last mile), and high speed mobile networks (5G). The importance of this last technology refers also to the inherent introduction of IoT(internet of things) which is reflected by sensors and devices, everywhere in the city. These sensors and devices collect the data to be stored, analyzed, and managed and give insights and better services to the citizens. The preparation of "intelligent" or "smart" applications is based upon the availability of these networks and connectivity. The involvement and alignment with telco providers or utility companies is crucial to develop the Digital Transformation program for the future.

● **Open data**

Apart from connectivity, the utilization of this data, or existing data registries is another cornerstone of a Digital Transformation program.
Within the realm of a city a lot of data is managed by the city hall. This data is sometimes private, but sometimes could also be used to optimize the delivery of some services (land information, contract information, ownership, etc.) The opening of these registries to be exploited and used in different applications is a real booster of the Digital Transformation program adoption. There are clear policy guidelines, and technical standards as proposed to make this happen. Furthermore, as already covered in the connectivity chapter, the gathering of data through the use of sensors and measuring devices (e.g. smart metering) will explode. The collection of this data is important, and the development of smart applications to exploit the insights out of this.

Most importantly in the creation of the ICT platforms is to adhere to some important criteria.
- Technical solutions are based on open standards

- Data is made available internally and externally (open data)
- Technical solutions are built modularly
- Systems are built on common digital platforms (internet, cloud)

Policy, regulations, budget

The creation of the Digital Transformation can not only be dealt with by focusing on the technical matters. In fact, the legal framework and the business model and financing are crucial.

● **Policy and legal regulations**

Legal regulations should be checked and adopted to deal with crucial elements like open data, data protection, cyber security, ownership, privacy. A correct assessment should be made of the actual legislation and policy framework, and corrective actions/decisions taken.

● **Financing models**

Financing discussions and decisions are an integral part of a successful implementation and must be factored into evaluations. The investment into the Digital Transformation platform is significant, although not profound when put in context of the overall operation budget of a city. However, it is worthwhile to consider different formats of financing.

Financing could come from different scenarios:

- o Internal financing from capital budget
- o Internal financing from operating budgets (but often shared between departments)
- o Public grants (national or international sponsors)
- o Industry Research & Development (typically as part of pilots)
- o Industry PPP (potentially bundling a number of services)
- o Market funds (loans as part of projects, equity as part of concessions)

The recipient of value is often not the expender of cost. In principle the service providers rape the benefits and the technical support functions make the investments.

Masterplan

As explained in the methodology, after vision, objectives, and initiatives, it is important to line up the priorities, define a roadmap and timeline, and assure the resources and capabilities needed to launch and manage the program.

As it stands today, this document only wants to focus on the VISION of Chisinau Digital Transformation 2030, and offering a framework to show the right initiatives, programs as to understand the overall scope and ambition of the project.
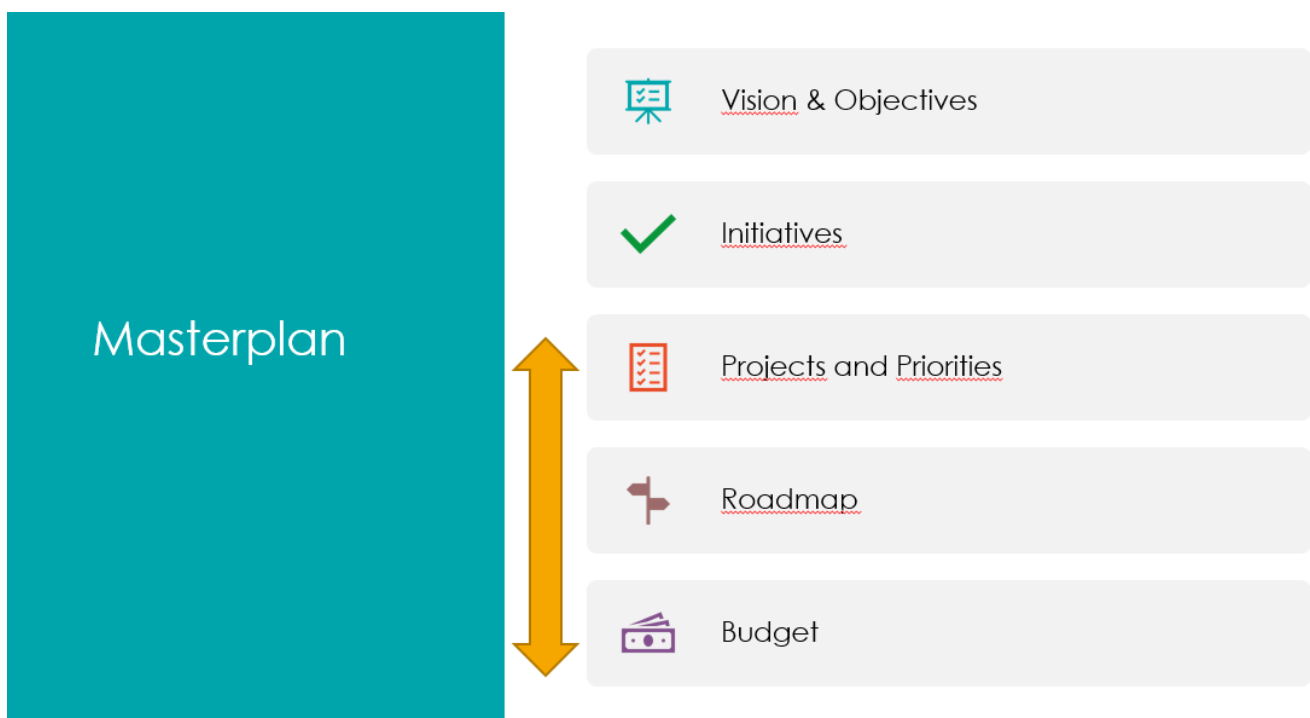
The next steps of the program include the following elements.

● Priorities

Quite a number of initiatives contain a set of projects which have been partly started, partly envisaged or requested. It is important to select the right projects, prioritize them and select them. As the overall approach is also to build upon existing achievements and steps taken, it is important to do a right "as is" analysis of the situation to define the priorities and to use the existing platforms and systems at national level.

● Roadmap

Putting a project on a timescale, and defining start and end-date, assumes the outline of a roadmap. Within the large scope of digital transformation programs, it is important to map quick wins, short term, mid-term and long-term projects. Long term projects will be needed to build the sustainable "platform" on which all further projects will be implemented.

● Resources/capabilities

A careful analysis of the capabilities needed to fulfill the programs is needed. Capabilities assessment should be done regarding the "as is" situation but will definitely lead to the search for and definition of additional resources, expertise, involvement of stakeholders. Resources include human capital, and financing. This chapter also will suggest potential sources of capabilities to be contacted.

KPIs or Metrics

Measuring the outcomes of the Chisinau Digital Transformation 2030 program is a clear necessity. Monitoring the continuous progress and checking the outcomes of the investments and initiatives are best practices in overall program management.

However, the complexity of this program does require a "leveled key performance indicator" model.

The model which is proposed is based upon **the business value framework**.

Business Value Framework: DIGITAL TRANSFORMATION – KPI's

	Mobility ambition	Meet climate ambitions	Safety & security	Social peace	Economic competitiveness	Service quality
Executive KPIs	Mobility ambition	Meet climate ambitions	Safety & security	Social peace	Economic competitiveness	Service quality
Core KPIs (mainly financial)	Cost of transport Business competitivenes	Energy & environmental cost	Cost of security And emergency services	Social funds- cost	GDP growth	Operating cost
Smart cities Initiatives	Mobility programs	Energy Efficiency Waste mgmt	Security and emergency services	Online services Payments, enrolments	Online services B2G portal PPP investments	Online services Registries Financial BO
Operating KPIs	Traffic measurements	C02 footprint	# of Critical incidents	#services	GDP growth	OPS cost
Process / Function	Multimodaltransport	Energy Efficiency	Surveillance and Monitoring	Digital transformation		Digital transf.
IT Initiatives	Central monitoring Public transport information systems Traffic lights parking	Smart Building initiatives Big River Waste initiatives Smart metering	Camera surveillance automation Emergency monitoring Systems	Education Health Culture	B2G portal	Digital transformation

It clearly states a hierarchy of ambitions to achieve.

● At the upper level, the City Hall wants to achieve results which are directly linked to the value citizens/businesses experience from the service delivered by the city to them. They are not concerned about how a technical implementation has been done, but just about how well the mobility in general works in the city, or how clean the air is. These upper levels are the executive KPIs which should be consistent with the political agenda of the city council.

Executive KPIs can be made "tangible" by trying to express them in some financial KPIs. Financial KPIs on City Hall level give quantitative evidence, and not only qualitative evidence. Some

clear examples are "overall cost of public transport", GDP growth of the city, operating costs of the city hall".

●   The measurement of the initiatives can be done on 2 levels. One level are clear operating KPIs of these services, and the other level are clear measurements of the outcome of the specific projects.

The importance of the introduction of the business value framework translates into a right measurement model of success, which clearly shows that a Digital Transformation program is carried by ALL service activities of the City Hall and impacts all citizens. A partial measurement of initiatives or projects would not contribute to the right ambitions of this program.

This model is strongly aligned with the OKR methodology (objectives, key results) which also should guide the performance of the teams working on these programs.

Risk management

This Chisinau Digital Transformation 2030 program will need to deal with several normal and intrinsic challenges. These challenges can appear alongside the program execution, but there are already quite some upfront challenges to be confronted with. It is better to proactively identify these challenges and propose a risk mitigation strategy. Risk management strategies deal with identifying the risks, give a probability indication and propose mitigating actions.

Some of the challenges and risks identified for the program are:

- **Stakeholders buy-in into the Digital Transformation plan**

There will be de facto a level of hesitance, lack of understanding, skepticism around the Digital Transformation program. A key activity of the program team is to explain to the different stakeholders in a transparent way the objectives, the approach, the potential outcome and the co-creation opportunity of these projects. This could be done by an orchestrated information campaign, clear workshops or pilot projects to gain the trust and stakeholders' support in a collaborative manner.

● **Lack of key people to run the Digital Transformation Program Office or execute the supporting initiatives.**

Some of the initiatives will need deep expertise to roll out these programs. Also, within the city hall or its agencies a core group of people, taking at heart these projects will be needed. For every project the key resources, and capabilities should be identified. As part of the route to success, external people, contractors, experts should be attracted to help in the accomplishment. These resources should be identified and budgeted accordingly.

● **Financing the initiatives**

Every project that will be launched and prioritized should be budgeted for the life cycle of this project. As stated already, different sources of financing are eligible, from internal operational and investment budgets to external private financing models (PPP, loans, equity). The core element is to include in the project planning the most appropriate financing model to be applied.

● **Organizational inertia**

The introduction of ICT technologies as a key enabler of efficient service delivery, or reduction of red tape involves a digital transformation of the processes. This applies to the core processes within the city hall operations. This process redesign is not an easy approach, as it does require cultural adoption, role changes and different working models. This digital transformation should be accompanied with a change management process. And this change management process should be identified as part of the project definition, planned and budgeted.

Conclusions

This document outlines the key VISION statement for Chisinau Digital Transformation 2030. It has been elaborated based on a Digital Transformation framework, which allows to structure the different initiatives, the different enabling initiatives, and the individual projects into a holistic construct.

Moreover, the Vision is a reflection, in which we broaden the definition of a Digital Transformation beyond technology and will support the central role that Chisinau city plays in local and international development and enhance the exchange of best practices. By focusing on how to build and deliver innovative initiatives with real impact (adjusted to the reality of Chisinau and uniqueness), we expect to help the Chisinau City Hall and other development partners to identify and ideate new ways of solving urban challenges – toward 2030, and beyond.

To steer and maintain the momentum of this program, a clear suggestion was made to create an Innovation Hub, or Digital Transformation Program Office.

Experience with other Digital Transformation programs, and the available literature has taught us some lessons to be taken or guidelines to be followed to make sure this program delivers upon its expectations.

Hierarchy of needs

According to Abraham Maslow's theory around the pyramid hierarchy of needs, a model has been developed to show the hierarchy of program elements to be taken into consideration to make this program successful.
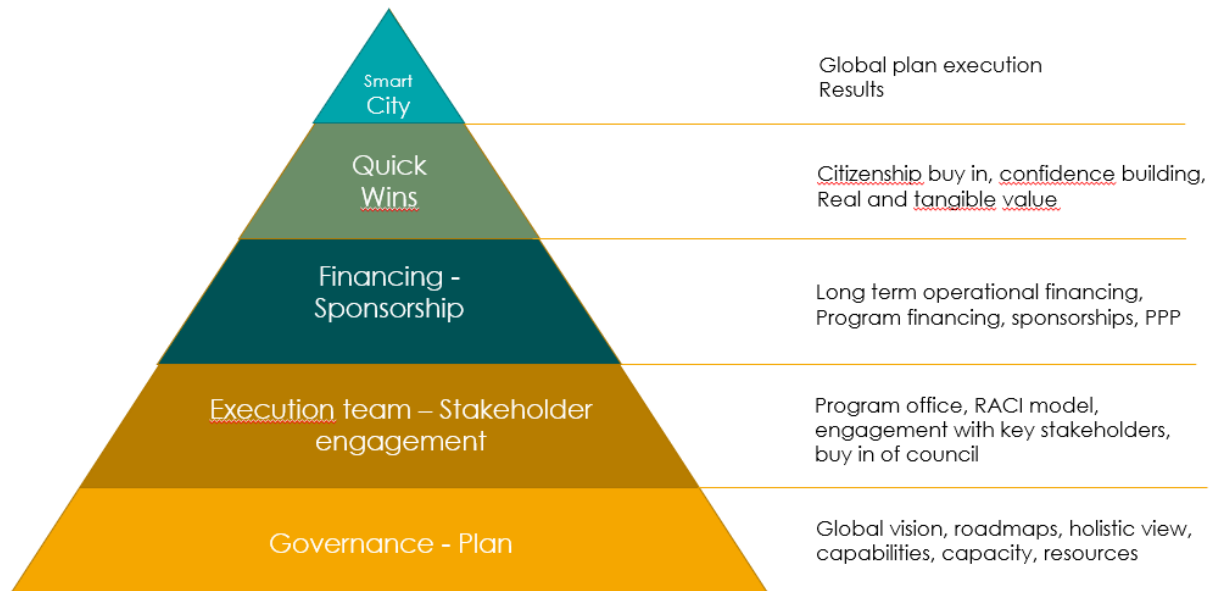
Level 1: Governance and plan

As clearly indicated a Digital Transformation plan is a multistakeholder, multi- annual, multi- faceted program. The core condition for success is the proper governance model, the clear vision and objective setting, and a right analysis of capabilities and resources to make it happen. Strategy without execution is hallucination.

Level 2: Execution team – Stakeholder engagement

The availability of experts, project leaders, ICT professionals is mandatory to make it happen. Technology will not only make the difference. A *conditio sine qua non* is the creation of this Digital Transformation program office, with initiative leaders with a clear objective and masterplan. As explained in the ecosystem chapter, the connection and involvement of the different stakeholders is another condition for success. Services, service integration and digital transformation does require the close connection with the users, application, and process owners.

Level3: Financing – sponsorship

Digital Transformation projects have a vast ambition and landscape of investments. Some of the infrastructural activities, or energy efficiency investments will require proper financing schemes. As explained in the financing enabling initiative this will require pro-active creative thinking and new financing and co-operation models.
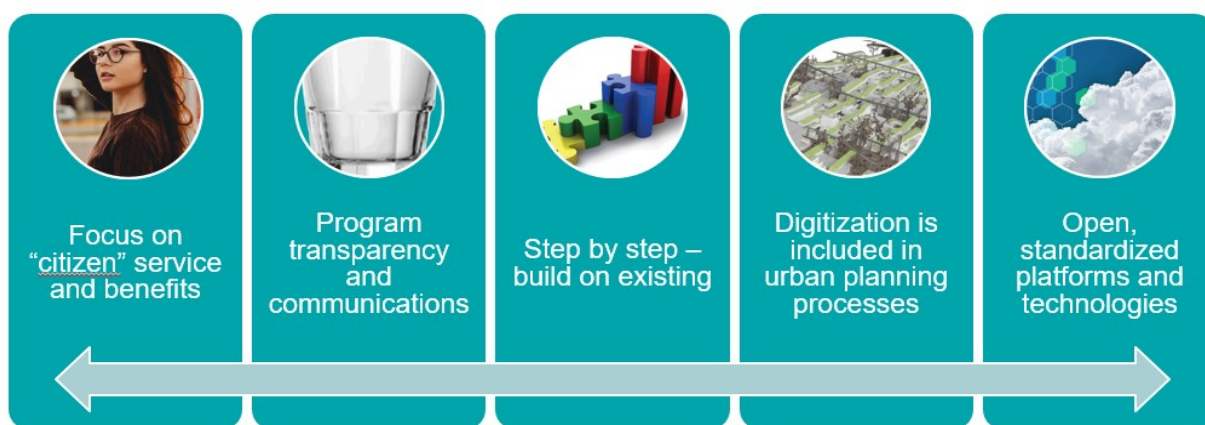
Level 4: Quick wins

Although Chisinau Digital Transformation 2030 ambitions tangible results for 2030, this does not stop it from achieving breakthrough offerings or quick wins in shorter time frames. Some important steps have been taken to deal with things like mobility, online service, or payment programs. Also, the creation of core data registries allows rapid value add service offerings to be defined and executed. The focus on some quick wins, in parallel with the sustainable platform and visionary objectives, will assure stakeholder motivation and confidence in the final outcomes. This should be an inherent part of the strategy.

Level 5: Digital Transformation program

The ultimate goal is to achieve the outcome of the overall plan. It will be a journey of several years. The common understanding and acceptance of the vision, and a full commitment to the required enabling initiatives will lead to the final results, and to the achievement of the 2 target objectives: a high quality of living for its citizens and visitors, and a prosperous entrepreneurial climate for its businesses.

Conditions for success

Apart from the hierarchy of needs, some guidelines can be formulated, as experienced over the years in similar projects.

| Focus on "citizen" service and benefits | Program transparency and communications | Step by step – build on existing | Digitization is included in urban planning processes | Open, standardized platforms and technologies |

Focus on "citizen" service and benefits

Any city can be a "smart city" if it adopts a citizen-centric approach and responds to both current and future needs and realities of its citizens and residents, while strategically mobilizing available resources. The core objective of the program is to offer citizens a better service, a better lifestyle, and a higher level of quality of living. The design methodology for the projects should have from the beginning this value offering in mind, and not only the smart or technological dimension.

Program transparency and communications

A first challenge is to get everyone on board for the acceptance and implementation of a project. Among the stakeholders are citizens, local businesses, technology

providers, project developers operating in the city, public service operators but also internally the personnel and colleagues within the city administration. All these people should be well informed and transparently explained what the objectives are. Communication, attractive presentations, moments of interaction like workshops, co-creation facilities are important to achieve this goal.

Build on the existing

Rome was not built overnight, nor Chisinau. It is fundamental to build the Digital Transformation plan step by step, project by project, service by service. However, this approach should fit into an overall architecture and ultimate city we want to build. Also, the adoption of some of last year's pilots is fundamental to make progress.

Digitization is included in the urban planning processes

Digital transformation is the evolving pursuit of innovative and agile business and operational models - fueled by evolving technologies, processes, analytics, and talent - to create new value and experiences for customers, employees and stakeholders (Brian Solis, 2019). City Hall operations, planning and service delivery is an on-going process with a lot of priorities, challenges, decisions taken. The core success of "Digital Transformation Chisinau 2030" is to include in the execution of all generic development programs, the digitization, smart dimension. Therefore, digital transformation should be inherently part of every initiative to be future proof.

Open standardized platforms and technologies

The ICT platform (applications, connectivity, data) should adhere to international open standards, and adopt common insights of this maturing industry. Cloud infrastructure, internet-based protocols, open data semantics are key conditions to avoid vendor lock in and allow future service integration. It should be obvious that this is only the beginning as the Internet of things will further enhance the smart dimension of city services tomorrow. As such openness and standards are crucial.

About the authors

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Wilfried Grommen is an international ICT expert. He has been working as a strategist and transformation manager for numerous governmental programs. As such he worked for IBM, Microsoft and HPE uniquely focusing on e-government services and smart cities. He has actively dealt with governmental projects in the EU, Belgium, Germany, Sweden, Romania, Moldova etc. He often was a keynote speaker on the Digital Moldova business forum. He contributed to and launched some Digital Transformation projects in Dubai, Stockholm and Antwerp. Mr. Grommen is a Belgian citizen, based in Brussels.

4T Think Tank

The 4T Think Tank is a pioneering initiative aiming to advance digital transformation within the Republic of Moldova, Eastern Partnership, South-Eastern Europe and beyond by enhancing competitiveness of the ICT sector and enabling adoption of innovative technologies on all levels, with the purpose of improving economic and social governance and generating positive impacts.

4T Think Tank brings together expertise accumulated during the last 15 years from public, private and associative sectors of Moldova and provides expertise to leaders, government and major stakeholders involved in advancing the Digital Transformation agendas.

The Foundation is positioned as a stakeholder in developing and implementing digital agendas in terms of promoting technology role as an enabler of economic growth, qualitative electronic public services, digital transformation of entrepreneurship, education, governance, etc.

Its mission is to consolidate and nurture the expertise dedicated to advance the digital transformation within the Republic of Moldova and in the Eastern Partnership countries, South-Eastern Europe, and beyond.

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Glossary

API

An Application Programming Interface (API). It is a set of definitions, protocols and tools that allows different software and hardware to integrate with one another.

Citizen-centric approach

The delivery of services based on solving the needs and challenges of the people they serve – used as a way to increase public satisfaction, improve efficiency and reduce costs.

Digital Government

The use of information and communication technologies (ICT) to improve the activities of public sector organizations.

E-Government

E-government uses information and communication technologies (ICT) by public administrations, in combination with organizational changes and new skills, to improve public services and democratic processes and facilitate the design and delivery of public policies.

Environment

The environment in Smart Cities is the natural part of the planet. To make the city sustainable and citizens' life quality on the highest possible level, the environment is the key part with the most sensitive monitoring.

Governance

Nowadays traditional forms of government are no longer sufficient to ensure effective use of the volume and variety of information or the creativity available in society. For this reason, administrations are opening up and initiating collaborative action with other social groups, e.g., citizens, the business community, and other local or regional authorities, alongside the traditional hierarchical forms of government.

ICT

Information and communication technologies, refers to the integration of telecommunications, computers, and associated enterprise software, middleware, storage, and audio-visual systems that enable users to access, store, transmit and manipulate info

Infrastructure refers to the fundamental facilities and systems serving a city, country, or other areas including the services and facilities necessary for its economy to function. ICT includes products that store, process, transmit, convert, duplicate, or receive electronic information like electronic textbooks, instructional software, email, chat, and distance learning programs.

Integrated City Operations

Combined and compatible operation of different city systems and exchange of data and information with the aim of achieving more effective outcomes with the least resource input such city systems include transport, healthcare, social services, education, cultural services, employment services, etc.

IoT

Internet of Things. The concept of things (such as devices or everyday objects) to have built-in internet connectivity and the ability to communicate with other connected devices.

KPI

Key performance indicator, clear metrics to measure the success of programs or projects.

OKR

Objectives, key results, project and management methodology, to measure the success of programs and steer organizations, to meet the objectives.

Open data

Open Data is the idea that some data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control. One of the most important forms of open data is open government data (OGD), which is a form of open data created by ruling government institutions. Open government data's importance is borne from it being a part of citizens' everyday lives.

Sensors

An electronic component, module or subsystem used to detect events, triggers or changes in the surrounding environment.

SMART City

A smart city is a place where traditional networks and services are made more efficient with the use of digital solutions for the benefit of its inhabitants and business.

A smart city goes beyond the use of digital technologies for better resource use and less emissions. It means smarter urban transport networks, upgraded water supply and waste disposal facilities and more efficient ways to light and heat buildings. It also means a more interactive and responsive city administration, safer public spaces and meeting the needs of an ageing population.

Smart infrastructure

The integration of smart technologies into the fundamental systems that serve a city or municipal area.

Smart street lighting

Streetlights that can be controlled wirelessly to save energy and reduce maintenance costs. The wireless network controlling street lighting can also be expanded to connect sensors that gather data on weather conditions, air pollution and more.

Smart networks

A network that contains built-in diagnostics, management, fault tolerance and other capabilities to prevent downtime and maintain efficient performance.

Smart parking

A system that helps drivers find vacant parking spaces using sensors and communications networks.

Sustainability

The maintenance and betterment of the ecological, social and economic health of a city.

Ubiquitous cities (U-cities)

A hyper-connected smart city: all information systems working in the city are linked and virtually everything is connected to a cohesive city platform.

Portfolio of SMART City related initiatives

Czech Smart City and Intelligent Mobility Projects in the City of Chisinau

1. Projects where the beneficiary is directly the City of Chisinau and/or its municipal organizations

Smart Transport and Mobility Strategy and Action Plan for Chisinau City

Period: 2020-2021

Implemented by: team of consultants from [Czech Technical University in Prague](#) and Czech company [SmartPlan](#)

https://undp.cz/portfolio-item/smart-transport-and-mobility-strategy-and-action-plan-for-chisinau-city/

https://www.md.undp.org/content/moldova/en/home/presscenter/pressreleases/2021/strategia-transport-inteligent.html

https://www.chisinau.md/libview.php?l=en&idc=403&id=34155&t=/PRESS/Press-Releases/Public-presentation-of-the-Smart-Transport-Mobility-Strategy-and-the-Action-Plan-for-Chisinau-City

Elaboration of a strategic document and action plan in the field of intelligent transport and mobility covering traffic management, public transport, parking, active mobility, road safety, electromobility and central ITS platform.

Implementation of the Smart City Platform in the City of Chisinau

Period: 2020-2021

Implemented by: Slovak company [ALAM](#) in collaboration with Czech company [Incinity](#)

https://www.eurasia.undp.org/content/dam/rbec/docs/internal/2020_SlovakChallengeFundinitiatives.pdf

Pilot project of implementation of smart city platform [Invipo](#) including operator dashboard for the city and public portal for the citizens including data integration in 4 modules – public transport,

parking, charging stations for electrical vehicles, environmental monitoring.

Dynamic Traffic Control and Intersection Coordination in the City of Chisinau

Period: 2021-2022

Implemented by: Czech company CROSS Zlín

https://undp.cz/portfolio-item/dynamic-traffic-control-and-intersection-coordination-in-the-city-of-chisinau/

Modern dynamic traffic control system with traffic signal plans that continuously adapt to detected actual traffic level together with intersection coordination at two first selected intersections in Chisinau and up-to-date traffic control software.

Public transport passenger information system in Chisinau

Period: 2021-2022

Implemented by: Czech company Herman systems

https://undp.cz/portfolio-item/public-transport-passenger-information-system-in-chisinau/

Pilot project of passenger information system at trolleybus/bus stops.

2. Selected further projects with other beneficiaries, but with relation to the City of Chisinau

Advanced traffic video analytic system for Ministry of Internal Affairs of Moldova

Period: 2021-2022

Implemented by: Czech company RCE systems

https://undp.cz/portfolio-item/advanced-traffic-video-analytic-system-for-ministry-of-internal-affairs-of-moldova/

Advanced automated AI-based video analytics software implemented on existing police cameras around Chisinau allowing to get real-time traffic data analytics. The data can be easily

transferred to Chisinau City as well as to the State Road Administration which both use the Invipo platform.

Automated parking system with integrated charger for electric vehicles in Chisinau

Period: 2021-2022

Implemented by: Czech company Green Center in collaboration with Moldovan company EV Point

https://undp.cz/portfolio-item/parking-with-charger-for-electric-vehicles-in-chisinau/

Automated parking that allows drivers to charge their vehicles during parking, pay for the charging at automatic payment stations and receive free parking if they are charged. At the same time the system will monitor the parking places dedicated to electric vehicles and inform operators if there are vehicles parked that are not being charged.